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Relevance scale ☐ ☐ ☐ ☐ ☐**1 [Fast detection of communication patterns in distributed executions](#)**

Thomas Kunz, Michiel F. H. Seuren

November 1997 **Proceedings of the 1997 conference of the Centre for Advanced Studies on Collaborative research**Full text available: [pdf\(4.21 MB\)](#)Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Understanding distributed applications is a tedious and difficult task. Visualizations based on process-time diagrams are often used to obtain a better understanding of the execution of the application. The visualization tool we use is Poet, an event tracer developed at the University of Waterloo. However, these diagrams are often very complex and do not provide the user with the desired overview of the application. In our experience, such tools display repeated occurrences of non-trivial commun ...

2 [Utilizing virtual shared memory in a topology independent, multicomputer environment](#)

C. Maples

May 1990 **Proceedings of the second annual ACM symposium on Parallel algorithms and architectures**Full text available: [pdf\(1.35 MB\)](#)Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)**3 [ScaLAPACK: a portable linear algebra library for distributed memory computers - design issues and performance](#)**

Laura Susan Blackford, J. Choi, A. Cleary, A. Petitet, R. C. Whaley, J. Demmel, I. Dhillon, K. Stanley, J. Dongarra, S. Hammarling, G. Henry, D. Walker

November 1996 **Proceedings of the 1996 ACM/IEEE conference on Supercomputing (CDROM)**Full text available: [pdf\(248.65 KB\)](#)Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

This paper outlines the content and performance of ScaLAPACK, a collection of mathematical software for linear algebra computations on distributed memory computers. The importance of developing standards for computational and message passing interfaces is discussed. We present the different components and building blocks of ScaLAPACK, and indicate the difficulties inherent in producing correct codes for networks of heterogeneous processors. Finally, this paper briefly describes future direc ...

4 [System architectures for computer music](#)

John W. Gordon

June 1985 **ACM Computing Surveys (CSUR)**, Volume 17 Issue 2Full text available:  pdf(4.61 MB)Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#), [review](#)

Computer music is a relatively new field. While a large proportion of the public is aware of computer music in one form or another, there seems to be a need for a better understanding of its capabilities and limitations in terms of synthesis, performance, and recording hardware. This article addresses that need by surveying and discussing the architecture of existing computer music systems. System requirements vary according to what the system will be used for. Common uses for co ...

5 What have we learnt from using real parallel machines to solve real problems?

G. C. Fox

January 1989 **Proceedings of the third conference on Hypercube concurrent computers and applications - Volume 2**Full text available:  pdf(4.08 MB)Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

We briefly review some key scientific and parallel processing issues in a selection of some 84 existing applications of parallel machines. We include the MIMD hypercube transputer array, BBN Butterfly, and the SIMD ICL DAP, Goodyear MPP and Connection Machine from Thinking Machines. We use a space-time analogy to classify problems and show how a division into synchronous, loosely synchronous and asynchronous problems is helpful. This classifies problems into those suitable for SIMD or MIMD ...

6 Memory conflicts and machine performance

P. Tang, R. H. Mendez

August 1989 **Proceedings of the 1989 ACM/IEEE conference on Supercomputing**Full text available:  pdf(675.23 KB)Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

The data transfer capacity of a vector machine is a critical factor influencing the performance of the machine. The capacity is a function of several hardware and software parameters: the bandwidth of the crossing network between processing unit and memory, the number of independent memory modules, memory access configuration, types of vector operations, and the number of access ports in-use. Memory contention occurs in a multiple access port vector machine. When long vector operation perfo ...

7 OoLALA: an object oriented analysis and design of numerical linear algebra

Mikel Luján, T. L. Freeman, John R. Gurd

October 2000 **ACM SIGPLAN Notices , Proceedings of the 15th ACM SIGPLAN conference on Object-oriented programming, systems, languages, and applications**, Volume 35 Issue 10Full text available:  pdf(678.43 KB)Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

In this paper we review the design of a sequential object oriented linear algebra library, OOLALA. Several designs are proposed and used to classify existing sequential object oriented libraries. The classification is based on the way that matrices and matrix operations are represented. OOLALA's representation of matrices is capable of dealing with certain matrix operations that, although mathematically valid, are not handled correctly by exi ...

Keywords: Java, numerical linear algebra, object orientation

8 Pen computing: a technology overview and a vision

André Meyer

July 1995 **ACM SIGCHI Bulletin**, Volume 27 Issue 3Full text available:  [pdf\(5.14 MB\)](#) Additional Information: [full citation](#), [abstract](#), [citations](#), [index terms](#)

This work gives an overview of a new technology that is attracting growing interest in public as well as in the computer industry itself. The visible difference from other technologies is in the use of a pen or pencil as the primary means of interaction between a user and a machine, picking up the familiar pen and paper interface metaphor. From this follows a set of consequences that will be analyzed and put into context with other emerging technologies and visions. Starting with a short historic ...

9 Three-dimensional medical imaging: algorithms and computer systems

M. R. Stytz, G. Frieder, O. Frieder

December 1991 **ACM Computing Surveys (CSUR)**, Volume 23 Issue 4Full text available:  [pdf\(7.38 MB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#), [review](#)

Keywords: Computer graphics, medical imaging, surface rendering, three-dimensional imaging, volume rendering

10 Using generative design patterns to generate parallel code for a distributed memory environment

Kai Tan, Duane Szafron, Jonathan Schaeffer, John Anvik, Steve MacDonald

June 2003 **ACM SIGPLAN Notices , Proceedings of the ninth ACM SIGPLAN symposium on Principles and practice of parallel programming**, Volume 38 Issue 10Full text available:  [pdf\(385.41 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

A design pattern is a mechanism for encapsulating the knowledge of experienced designers into a re-usable artifact. Parallel design patterns reflect commonly occurring parallel communication and synchronization structures. Our tools, CO2P3S (Correct Object-Oriented Pattern-based Parallel Programming System) and MetaCO2P3S, use *generative design patterns*. A programmer selects the parallel design patterns that are appropriate for an application, and then adapts the patterns for that specific ...

Keywords: design patterns, frameworks, parallel programming, programming tools

11 Loop optimization for a class of memory-constrained computations

D. Cociorva, J. W. Wilkins, C. Lam, G. Baumgartner, J. Ramanujam, P. Sadayappan

June 2001 **Proceedings of the 15th international conference on Supercomputing**Full text available:  [pdf\(160.59 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Compute-intensive multi-dimensional summations that involve products of several arrays arise in the modeling of electronic structure of materials. Sometimes several alternative formulations of a computation, representing different space-time trade-offs, are possible. By computing and storing some intermediate arrays, reduction of the number of arithmetic operations is possible, but the size of intermediate temporary arrays may be prohibitively large. Loop fusion can be applied to reduce memory ...

12 Evaluating automatic parallelization for efficient execution on shared-memory multiprocessors

Kathryn S. McKinley

July 1994 **Proceedings of the 8th international conference on Supercomputing**

Full text available:  pdf(1.20 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

We present a parallel code generation algorithm for complete applications and a new experimental methodology that tests the efficacy of our approach. The algorithm optimizes for data locality and parallelism, reducing or eliminating false sharing. It also uses interprocedural analysis and transformations to improve the granularity of parallelism. Although the individual components of the algorithm have been published previously, their coordination is unique to this paper. For experimental v ...

13 Out-of-core FFTs with parallel disks

Thomas H. Cormen, David M. Nicol

December 1997 **ACM SIGMETRICS Performance Evaluation Review**, Volume 25 Issue 3

Full text available:  pdf(1.37 MB) Additional Information: [full citation](#), [abstract](#), [citations](#), [index terms](#)

We examine approaches to computing the Fast Fourier Transform (FFT) when the data size exceeds the size of main memory. Analytical and experimental evidence shows that relying on native virtual memory with demand paging can yield extremely poor performance. We then present approaches based on minimizing I/O costs with the Parallel Disk Model (PDM). Each of these approaches explicitly plans and performs disk accesses so as to minimize their number.

14 Cache Memories

Alan Jay Smith

September 1982 **ACM Computing Surveys (CSUR)**, Volume 14 Issue 3

Full text available:  pdf(4.61 MB) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

15 Curriculum 68: Recommendations for academic programs in computer science: a report of the ACM curriculum committee on computer science

William F. Atchison, Samuel D. Conte, John W. Hamblen, Thomas E. Hull, Thomas A. Keenan, William B. Kehl, Edward J. McCluskey, Silvio O. Navarro, Werner C. Rheinboldt, Earl J. Schweppe, William Viavant, David M. Young

March 1968 **Communications of the ACM**, Volume 11 Issue 3

Full text available:  pdf(6.63 MB) Additional Information: [full citation](#), [references](#), [citations](#)

Keywords: computer science academic programs, computer science bibliographies, computer science courses, computer science curriculum, computer science education, computer science graduate programs, computer science undergraduate programs

16 Session summaries from the 17th symposium on operating systems principle (SOSP'99)

Jay Lepreau, Eric Eide

April 2000 **ACM SIGOPS Operating Systems Review**, Volume 34 Issue 2

Full text available:  pdf(3.15 MB) Additional Information: [full citation](#), [index terms](#)

17 Query processing techniques for arrays

Arunprasad P. Marathe, Kenneth Salem

August 2002 **The VLDB Journal — The International Journal on Very Large Data Bases**,
Volume 11 Issue 1

Full text available:  pdf(322.53 KB) Additional Information: [full citation](#), [abstract](#), [index terms](#)

Arrays are a common and important class of data. At present, database systems do not provide adequate array support: arrays can neither be easily defined nor conveniently manipulated. Further, array manipulations are not optimized. This paper describes a language called the *Array Manipulation Language* (AML), for expressing array manipulations, and a collection of optimization techniques for AML expressions. In the AML framework for array manipulation, arbitrary externally-defined functions ...

Keywords: Array manipulation language, Array query optimization, Declarative query language, Memory-usage optimization, Pipelined evaluation, User-defined functions

18 Performance debugging shared memory parallel programs using run-time dependence analysis

Ramakrishnan Rajamony, Alan L. Cox

June 1997 **ACM SIGMETRICS Performance Evaluation Review , Proceedings of the 1997 ACM SIGMETRICS international conference on Measurement and modeling of computer systems**, Volume 25 Issue 1

Full text available:  pdf(2.37 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

We describe a new approach to performance debugging that focuses on automatically identifying computation transformations to reduce synchronization and communication. By grouping writes together into *equivalence classes*, we are able to tractably collect information from long-running programs. Our performance debugger analyzes this information and suggests computation transformations in terms of the source code. We present the transformations suggested by the debugger on a suite of four ap ...

19 Persistent memory: a storage architecture for object-oriented database systems

Satish M. Thatte

September 1986 **Proceedings on the 1986 international workshop on Object-oriented database systems**


Full text available:  pdf(1.13 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Object-oriented databases are needed to support database objects with a wide variety of types and structures. A persistent memory system provides a storage architecture for long-term, reliable retention of objects with rich types and structures in the virtual memory itself. It is based on a uniform memory abstraction, which eliminates the distinction between transient objects (data structures) and persistent objects (files and databases), and therefore, allows the same set of powerful and f ...

20 The merge/purge problem for large databases

Mauricio A. Hernández, Salvatore J. Stolfo

May 1995 **ACM SIGMOD Record , Proceedings of the 1995 ACM SIGMOD international conference on Management of data**, Volume 24 Issue 2

Full text available:  pdf(1.37 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Many commercial organizations routinely gather large numbers of databases for various marketing and business analysis functions. The task is to correlate information from different databases by identifying distinct individuals that appear in a number of different databases typically in an inconsistent and often incorrect fashion. The problem we study here is the task of merging data from multiple sources in as efficient manner as possible, while maximizing the accuracy of the result. We call thi ...

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